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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,828	07/03/2003	Robert Douglas Elliot	90177	6792
24628	7590	11/16/2005		
WELSH & KATZ, LTD 120 S RIVERSIDE PLAZA 22ND FLOOR CHICAGO, IL 60606			EXAMINER HAROON, ADEEL	
			ART UNIT 2685	PAPER NUMBER

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/613,828

Applicant(s)

ELLIOT ET AL.

Examiner

Adeel Haroon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____   | 6) <input type="checkbox"/> Other: ____                                     |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1- 5, 9, 10, 12, 14, and 18-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Liu et al. (U.S. 5,652,591).

With respect to claim 1, Liu et al. disclose an antenna system in figure 4 with a coverage antenna, element numbers 102-107, with a coverage beam pattern and an auxiliary antenna, element number 110 and 111, with an auxiliary beam pattern. Liu et al. discloses that the mainlobe of the auxiliary beam pattern is used to suppress the sidelobe of the coverage antenna; therefore, the mainlobe of the auxiliary antenna must have an amplitude lower than an amplitude of a mainlobe of coverage beam pattern and a width lower than a width of said mainlobe of coverage beam pattern since the amplitude of the auxiliary antenna is matched with the sidelobe of the coverage antenna (Column 1, lines 55-67). Liu et al. teaches that the phase of the auxiliary antenna is matched with that of the coverage beam pattern's sidelobe (Column 2, lines 30-34),

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which is interpreted as that the phase is opposite of that of the coverage beam pattern in order to suppress the sidelobe interference.

With respect to claim 2, Liu et al. discloses that the mainlobe of the auxiliary antenna expands and contracts in the same fashion as the sidelobe pattern of the coverage antenna thus it has the same substantially equal width (Column 2, line 64 – Column 3, line 4).

With respect to claim 3, Liu et al. teaches that the phase is matched of the two antennas to cancel out the sidelobe interference, which is interpreted as that the phase is opposite thus  $180^\circ$  (Column 2, lines 30-34).

With respect to claim 4, Liu et al. discloses that the direction of the mainlobe of the auxiliary antenna is aligned with the direction of the sidelobe (Column 2, line 64 – Column 3, line 4).

With respect to claim 5, Liu et al. discloses that the antenna system is operable in receive mode (Column 1, lines 47-54).

With respect to claim 9, Liu et al. discloses a variable phase shifter, element number 124, for varying the phase of the mainlobe of the auxiliary beam pattern (Column 3, lines 41-46).

With respect to claim 10, Liu et al. discloses an attenuator, element number 122, for lowering the amplitude of the mainlobe of the auxiliary beam pattern (Column 3, lines 41-46).

With respect to claim 12, Liu et al. teaches that the length of the coverage antenna is smaller than that of the auxiliary antenna since the auxiliary antenna is

placed on the outside of the coverage antenna; therefore the feed lines of the auxiliary antenna must be longer in length.

With respect to claim 14, it is considered inherent that since the width of the auxiliary beam pattern is lower than that of the coverage antenna, that it also holds true in the vertical plane.

With respect to claim 18, Liu et al. discloses a phase shifter, element number 124, for steering the auxiliary beam pattern (Column 3, lines 41-46).

With respect to claims 19 and 20, Liu et al. discloses that the spacing in between the coverage antenna and auxiliary antenna is less than one wavelength (Column 3, lines 19—25).

With respect to claims 21 and 22, Liu et al. shows in figure 4 that each coverage antenna element, 102-107, and auxiliary antenna elements, 110-111, have a substantially planar reflector (Column 3, lines 33-52).

3. Claims 25-26, 28-31, and 34-36, and 40-45 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka et al. (U.S. 6,252,560).

With respect to claim 25, Tanaka et al. discloses an antenna system including a coverage antenna, element number 3, with a coverage beam pattern and an auxiliary antenna, element number 5 (Column 4, lines 20-31). Tanaka et al. also discloses that the auxiliary antenna is used to suppress sidelobes of the main antenna; therefore having a mainlobe with amplitude, width, and direction so as to modify the coverage

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beam pattern (Column 2, lines 21-35). Tanaka et al. further discloses that the antenna system is operable in both receive mode for receiving uplink signals and transmit mode for transmitting downlink signals (Column 8, lines 5-8).

With respect to claim 26, Tanaka et al. teaches using the auxiliary beam pattern to suppress the sidelobes of the coverage beam pattern; therefore, the main lobe of the auxiliary beam pattern must have a width lower than that of the mainlobe of the coverage beam pattern (Column 2, lines 21-35).

With respect to claims 28 and 29, Tanaka et al. discloses using the mainlobe of the auxiliary beam pattern to adjust the position of a null and null-fill the coverage beam pattern (Column 8, lines 55-63).

With respect to claims 30 and 31, Tanaka et al. further discloses using variable phase shifters, element number 82, to vary the phase of the auxiliary antenna to modify said coverage antenna (Column 8, lines 51-54).

With respect to claim 34, Tanaka et al. teaches that the length of the coverage antenna is smaller than that of the auxiliary antenna since the auxiliary antenna is placed on the outside of the coverage antenna; therefore the feed lines of the auxiliary antenna must be longer in length.

With respect to claim 35, Tanaka et al. also teaches that the auxiliary antenna has more antenna elements since it has it on both sides of the coverage antenna (Column 4, line 66 – Column 5, line 4).

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With respect to claim 36, it is considered inherent that since the width of the auxiliary beam pattern is lower than that of the coverage antenna, that it also holds true in the vertical plane.

With respect to claim 40, Liu et al. discloses a phase shifter, element number 82, for steering the auxiliary beam pattern (Column 8, lines 51-54).

With respect to claims 41 and 42, Tanaka et al. discloses that the spacing in between the coverage antenna and auxiliary antenna is less than one wavelength (Column 5, lines 51—56).

With respect to claims 43-45, Tanaka et al. discloses a planar reflector, element number 4, for reflecting radiation from both coverage and auxiliary antennas in figure 7 (Column 6, lines 33-35).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6-8, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. in view of Tanaka et al. (U.S. 6,252,560).

With respect to claims 6 and 7, the antenna system of Liu et al. is described above in the discussion of claim 1. Liu et al. does not expressly disclose that the antenna system can be used in transmit mode. However, Tanaka et al. discloses an antenna system that uses an auxiliary antenna to suppress sidelobe interference of a coverage antenna thus making it analogous art since it contains the same features as Liu et al. and is in the same field of endeavor (Column 2, lines 21-35). Tanaka et al. also teaches operating the antenna system in both receive and transmit mode (Column 8, lines 5-8). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to operate Liu et al.'s antenna system in both receive and transmit mode as taught by Tanaka et al. in order to be able to perform both functions.

With respect to claim 8, it is well known in the art that when an antenna system is capable of both receive and transmit mode that it performs both functions at different frequencies in order to avoid signal interference. Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to receive and transmit at two different frequencies in the modified system of Liu et al. and Tanaka et al. in order to avoid signal interference.

With respect to claim 13, the antenna system of Liu et al. is described above in the discussion of claim 1. Liu et al. does not expressly disclose that the coverage antenna has a smaller number of antenna elements than that of the auxiliary antenna. However, Tanaka et al. discloses an antenna system that uses an auxiliary antenna to suppress sidelobe interference of a coverage antenna thus making it analogous art since it contains the same features as Liu et al. and is in the same field of endeavor

(Column 2, lines 21-35). Tanaka et al. also teaches that the auxiliary antenna has more antenna elements since it has it on both sides of the coverage antenna (Column 4, line 66 – Column 5, line 4). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to use Tanaka et al's technique of having more antenna elements on the auxiliary antenna in Liu et al.'s antenna system in order to have a more directive auxiliary antenna beam.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. in view of Morris (U.S. 5,523,875).

With respect to claim 11, the antenna system of Liu et al. is described above in the discussion of claims 1 and 10. Liu et al. does not expressly disclose the attenuator being a motorized electromechanical attenuator. However, Morris teaches the use of a motorized electromechanical attenuator for a signal coming from an antenna system (Column 3, lines 40-57). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to use Morris's motorized electromechanical attenuator in Liu et al.'s antenna system to control the amplitude of the signals.

7. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. in view of Bevan et al. (U.S. 6,311,075 provided by the applicant).

With respect to claims 15-17, the antenna system of Liu et al. is described above in the discussion of claim 1. Liu et al. does not expressly disclose that the antenna system is at a downtilt angle. However, Bevan et al. discloses an antenna system that has a downtilt angle of the antenna system (Column 3, lines 21-28). Therefore it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to apply Bevan et al.'s downward tilting technique to the antenna system of Liu et al. in order to cover close in areas. Also, when the antenna system is tilted downward, the angles of the auxiliary antenna must be different and lower than that of the coverage antenna in order to still suppress the sidebands of the coverage antenna.

8. Claims 23 and 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al..

With respect to claim 23, the antenna system of Liu et al. is described above in the discussion of claims 21 and 22. It would be obvious to one of ordinary skill in the art at the time of the applicant's invention to have all antenna elements on one planar reflector in order to conserve space.

With respect to claim 24, the antenna system of Liu et al. is described above in the discussion of claim 1. Liu et al. discloses the use of the antenna system in a mobile communication wireless network (Column 1, lines 31-38). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to use

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Liu et al's system in a mobile communication wireless network with a use of a network controller in order to have control over the antenna system in the network.

9. Claims 27 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al..

With respect to claim 27, the antenna system of Tanaka et al. is described above in the discussion of claim 25. It is well known in the art that when an antenna system is capable of both receive and transmit mode that it performs both functions at different frequencies in order to avoid signal interference. Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to receive and transmit at two different frequencies in the antenna system of Tanaka et al. in order to avoid signal interference.

With respect to claim 46, the antenna system of Tanaka et al. is described above in the discussion of claim 25. Tanaka et al. discloses the use of the antenna system in a mobile communication wireless network (Column 1, lines 14-18). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to use Tanaka et al's system in a mobile communication wireless network with a use of a network controller in order to have control over the antenna system in the network.

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10. Claim 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. in view of Liu et al..

With respect to claim 32, the antenna system of Tanaka et al. is described above in the discussion of claim 25. Tanaka et al. further discloses amplifiers, element number 81, to adjust the amplitude of the auxiliary beam pattern (Column 8, lines 51-54). Tanaka et al. does not expressly disclose an attenuator. However, Liu et al. discloses an antenna system that uses an auxiliary antenna to suppress sidelobe interference of a coverage antenna thus making it analogous art since it contains the same features as Tanaka et al. and is in the same field of endeavor (Column 2, lines 21-35). Liu et al. discloses an attenuator, element number 122, for lowering the amplitude of the mainlobe of the auxiliary beam pattern (Column 3, lines 41-46). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to use the attenuator's technique of Liu et al. in the system of Tanaka et al. in order to control the amplitude of the auxiliary beam.

11. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. and Liu et al. further in view of Morris (U.S. 5,523,875).

With respect to claim 33, the modified antenna system of Tanaka et al. and Liu et al. is described above in the discussion of claims 25 and 32. Neither Tanaka et al. nor Liu et al. expressly disclose the attenuator being a motorized electromechanical

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attenuator. However, Morris teaches the use of a motorized electromechanical attenuator for a signal coming from an antenna system (Column 3, lines 40-57). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to use Morris's motorized electromechanical attenuator in the modified antenna system of Tanaka et al. and Liu et al. to control the amplitude of the signals.

12. Claims 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. in view of Bevan et al. (U.S. 6,311,075 provided by the applicant).

With respect to claims 37-39, the antenna system of Tanaka et al. is described above in the discussion of claim 25. Tanaka et al. does not expressly disclose that the antenna system is at a downtilt angle. However, Bevan et al. discloses an antenna system that has a downtilt angle of the antenna system (Column 3, lines 21-28).

Therefore it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to apply Bevan et al.'s downward tilting technique to the antenna system of Tanaka et al. in order to cover close in areas. Also, when the antenna system is tilted downward, the angles of the auxiliary antenna must be different and lower than that of the coverage antenna in order to still suppress the sidebands of the coverage antenna.

**Conclusion**

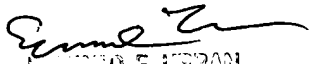
13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Masenten et al. (U.S. 6,823,174) discloses an antenna array system with error correction method.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adeel Haroon whose telephone number is (571) 272-7405. The examiner can normally be reached on Monday thru Friday, 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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